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A CRITICAL REVIEW OF THE FENESTRATION OPERATION: REPORT OF CASES.*

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In 1936, a committee of the American Otological Society under the chairmanship of Duel[1] published a most comprehensive survey of the literature concerning otosclerosis. This survey laid very little stress on the surgical treatment of this condition, except to mention that Jenkins, Holmgren and Sourdille had reported their attempts to make a permanently mobile fistula in the horizontal semicircular canal. In 1937, Holmgren[2] and Sourdille[3] read papers in this country concerning their work. Both of these workers used multiple-stage operations to accomplish their desired end. In 1938, Lempert[4] published the technique of a one-stage operation. Since then this operation has become known as the "Fenestration Operation."

In this paper, I propose to review the published literature concerning this operation and to analyze the work as follows:

1. Indications for the operation. *2.* Anesthesia. *3.* Surgical approach. *4.* Technique of operation. *5.* Postoperative care and complications. *6.* Closure of the fenestra. *7.* Evaluation of results and report of cases.

INDICATIONS FOR THE OPERATION.

The literature is definitely confusing on this point. At the outset, it would be well to recall some accepted facts concern-

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ing otosclerosis. Jones[31] collected several cases in the literature where otosclerosis existed in parts of the capsule without evidence of stapes fixation. Guild[36] reported the histological studies of 81 otosclerotic ears. He found that 10 showed ankylosis of this stapedial footplate, and in another 45, there were otosclerotic areas within 0.1 mm. of the footplate.

Lempert[5,6,7] mentions that stapes fixation is an indication, but does not say how he tests for this nor does he give his operative findings on this point. Campbell[14] gives a good general outline of indications but does not stress stapes fixation. Shambaugh[29] says that he palpates the stapes at each operation but does not give his findings. The Guggenheims[19] point out the long known fact that otosclerosis not infrequently produces the impediment to sound waves at a point closer to the VIIIth nerve than the oval window. The conclusion that all cases of otosclerosis proceed to nerve involvement is entirely unwarranted. The unpredictability concerning the extent and rate of decreased air conduction hearing in these cases is about the only positive observation that one can make at this time; therefore, in my opinion, the one and only indication for this operation is progressive impediment to the transmission of sound waves in or out through the oval window in the absence of evidence of lesions elsewhere in the hearing mechanism. The method whereby one can arrive at this conclusion with some degree of positiveness presents many problems.

It might be well to mention some of the accepted points in reaching the diagnosis of progressive stapedial impediment.

1. History: *A.* Bilateral progressive hearing impairment. *B.* Family tendency (not necessary). *C.* Aggravation by pregnancy (not necessary). *D.* Absence of previous attacks of otitis media of any consequence.

2. Physical Findings: *A.* Essentially normal tympanic membranes. *B.* Absence of gross nasopharyngeal pathology. *C.* Normal functioning Eustachian tubes.

3. Audiometric and Other Tests: *A.* Bilateral audiometric air conduction hearing of an average 40 db. loss or greater for the frequencies of 128 to 4,096, inclusive. *B. Bilateral*

audiometric bone conduction hearing of 25 db. loss or less for the same frequencies. *C.* Normal caloric tests for labyrinthian function.

It is generally agreed that before a patient is subjected to this operation his hearing impairment should be of a bilateral nature, psychologically apparent to the patient and audiometrically apparent to the surgeon. As suggested by Shambaugh,[24] the poorer ear should always be selected for the operation.

The Gellé test for stapedial fixation is seldom mentioned as one of the indications for this procedure. My experience has shown that this test is of very little value, particularly because it is very difficult to evaluate in a person with a 40 db. loss or greater. This holds true even when the test is done with the audiometer.

I would like to mention some observations concerning bone conduction audiometric testing that I have made during the past 15 years. There are three variables in audiometric testing, namely, the patient, the audiometer and the examiner. These are more pronounced in bone conduction testing than in air conduction testing, particularly with respect to the audiometer and the examiner. For this reason, I do all of my bone conduction testing. Improvement in our ability to diagnose stapedial impediment will follow the development of better and more accurate methods in bone conduction testing.

I have followed 32 cases of otosclerosis for periods ranging from 18 months to 12 years. The minimum number of complete audiometric studies on these patients is three. Seven of these cases showed, either on the first or second examination, a poorer bone conduction response at 2,048 than at 1,024 and also a poorer response at 4,096 than at 2,048. These seven cases were the only ones that showed definite progressive bone conduction hearing loss.

Later in this paper, I am reporting my results in eight fenestration cases of at least six months' duration. Two of these cases showed a preoperative bone conduction curve as described immediately above. At operation, these two cases showed no evidence of stapedial fixation. Postoperatively, these two cases showed negligible hearing improvement;

therefore, I offer as a contraindication to the fenestration operation a bone conduction hearing curve of steadily decreasing response from 128 to 4,096.

ANESTHESIA.

The combination of analgesia and local anesthesia as first described by Lempert[4] and Branower still seems to be the anesthesia of choice by most workers in this field. Shambaugh[24] states that he uses avertin. Dr. B. B. Sankey (Chief Anesthetist, St. Luke's Hospital, Cleveland) has managed the anesthesia in my cases and we have used the Lempert technique. At Sankey's suggestion, we have continuously administered intranasal oxygen throughout the operation. This has materially reduced the amount of bleeding and also the restlessness of the patient.

SURGICAL APPROACH.

The endaural approach as first described by Lempert[4] is the method of choice of most of the workers in this field. Campbell[16] used this approach combined with a postauricular incision in some of his cases, but he did not give his reasons. Kopetzky[30] says that the postauricular approch has many obvious advantages over the endaural approach, but he does not enumerate them nor does he make it clear that he has ever used the endaural approach.

The verbal description of the endaural incisions given by Lempert[4] is very accurate, but the accompanying illustrations are very misleading. Lempert has exhibited some markedly improved illustrations but these have not been published. I have used the endaural approach on 29 patients and believe it to be superior to the postauricular approach for the following reasons:

1. Exposure of the epitympanic space is much easier. *2.* The use of curettes and burr is not restricted to a 45° angle as with the postauricular incision. *3.* The problem of getting the incision to close is eliminated. *4.* Postoperative discomfort is definitely less. *5.* Daily inspection of the entire operative field is possible without disturbing the wound. *6.* The mobility of the auricle allows one to exenterate even the

larger mastoid cavities. 7. No cases of perichondritis, chondritis or atresia of the ear canal have been observed.

TECHNIQUE OF OPERATION.

Although Lempert[5] originally advocated exenterating only those mastoid cells necessary to perform the fenestration, he[6,7] now recommends a rather thorough cleaning out of the mastoid. Shambaugh and some other workers in this field do not believe that it is necessary to remove most of the mastoid cells. If the only indication for doing a partial exenteration is the shortening of the operative time, I do not consider this as sound surgery. In my opinion, a clean, smooth cavity would seem to facilitate epithelialization even though these cells are not infected.

Lempert first created the fenestra in the lateral most portion of the horizontal semicircular canal, leaving most of the pyramidal eminence in place and also leaving the incus *in situ*. Later, he[7] recommended removal of the incus and most of the pyramidal eminence. The position of the fenestra was moved medially and superiorly over the ampullated end of the horizontal canal. He called this the surgical dome of the vestibule. Some of his critics confused this with the so-called "anatomical dome of the vestibule" and attempted to show how this would be impossible of attainment. Most workers in the field adopted this change and found that their percentage of fistula closures was reduced.

Shambaugh[27] offered two changes from Lempert's technique in the introduction of constant saline irrigation during creation of the fenestra and the use of a 7x dissecting microscope. The arguments as to whether constant or intermittent irrigation is better and whether a more permanently mobile fistula can be created under two or seven times magnification seems rather academic to me. The availability of the higher magnification for inspection of the fenestra is undoubtedly a distinct advantage.

Lempert introduced a metallic obturator in his "nov-ovalis" in a relatively small number of cases but soon abandoned this procedure. Early in the development of this procedure, there was some discussion as to whether it was better to remove the endosteum or to try to leave it intact. Most workers

believe that it is better to remove the endosteum even with the edges of fenestra. Lempert[9] has recently reported the placing of a carefully fashioned piece of fibro-elastic cartilage from the concha into the fenestra before placing the flap over the window. He stated that he had done this in 50 cases of at least six months' duration without evidence of closure in any of them. I have followed this technique in my three most recent cases, but can only report at this time that the immediate postoperative improvement in hearing is not as good as that noticed in my earlier successful cases.

POSTOPERATIVE CARE AND COMPLICATIONS.

The postoperative stay of these patients in the hospital varies from nine to 14 days. Sterile precautions in handling the wound should be observed for at least four weeks. The incision extending between the tragus and the helix should be kept open at every dressing for at least three weeks. This will prevent atresia. Fairly frequent applications of 1 per cent Gentian Violet solution to the cavity facilitates epithelialization of the cavity but, as pointed out by Smith,[35] contact of this drug with the tympanic membrane should be avoided. After two weeks, the patient need wear only a cotton plug in the operated wound.

Postoperative traumatic labyrinthitis as manifested by dizziness and nystagmus lasts from five to 14 days. This complication has been reported to be permanent in an occasional case. The degree and length of persistence of vertigo seems to vary in direct proportion to the patient's preoperative tendency to motion sickness.

The apparent failure of some of the workers in this field to factually report their more serious complications is the greatest detriment to the progress of the work. This is most regrettable because the incidence of such things as a permanent paralysis of the VIIth nerve, totally dead labyrinth or persistent vertigo make up not more than 2 per cent of the operated cases.

CLOSURE OF THE FENESTRA.

Everyone working in this field seems agreed that the closure of the fenestra is the one thing that makes for poor

results in this operation. No one is agreed on the answer to the question of why some fenestrae close and others stay open. Canfield,[10,11] Guggenheims[19,20,21] and Lempert, et al.,[8] have reported experimental work done on animals. The only accepted conclusion is that osteogenesis may arise from the endosteal layer of bone, the periosteal layer of bone or both, but never from the enchondrial layer.

The time element for closure of the fenestra in humans is very uncertain. In my experience, evidence of closure of the fenestra was apparent from the twelfth to the sixteenth week. It is generally agreed, at this time, that a fenestra that remains open from six to eight months will probably remain permanently mobile; however, it must be remembered that these same observers made similar statements with a time limit of two months and then four months. The theory behind Lempert's proposed cartilaginous "stoppel" is very interesting and possibly this is the answer to a higher percentage of permanently mobile fenestrae.

EVALUATION OF RESULTS AND REPORT OF CASES.

The evaluation of results from this operation is still a controversial issue among the workers in this field. In order to properly evaluate increases or decreases in hearing, one must bring his thinking up to date on the testing of hearing.

In Fig. 1, there is shown a standard audiometric chart with sound intensity figures written on the decibel lines from 10 to 60. The audiometer chart is not an arithmetical progression, but a geometrical one. The sound intensity with the audiometer set at 10 db. loss is 10 times the intensity of the sound at 0 db. loss. At 20 db. loss, it is 100 times the intensity at 0 db. loss. From a theoretical point of view, a change in hearing from 60 db. loss to 40 db. loss is much greater than the change in hearing from a 40 db. loss to a 20 db. loss.

With this in mind, the author[32] proposed a method of determining percentage hearing loss by combining the average decibel loss to pure tones with the average loss to the spoken voice. The following year a committee of consultants to the Council of Physical Therapy of the American Medical Association[34] reported a method of determining a percentage loss by weighting the pure-tone audiometer findings in order that

they would more closely correspond to actual loss for speech. In another paper, the author[33] compared these two methods in a relatively large series of cases. While there was considerable variance in some type of cases, in typical cases of otosclerosis the percentage losses were essentially the same.

Both Lempert and Shambaugh point out the psychological aspect of patients having received improvement in hearing

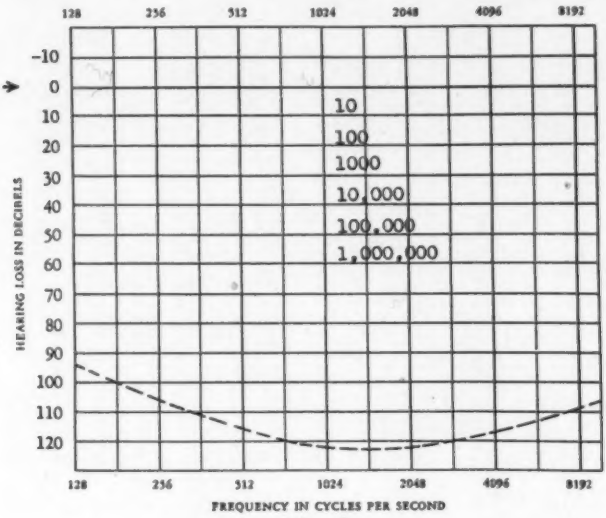

Fig. 1

by this operation. The psychological aspect of dealing with hearing-handicapped people is well known. In Cleveland, for the past four years, we have been speaking of the hearing percentage that a patient has rather than the percentage of loss. It has been a distinct benefit and I would recommend that it be adopted as a universal practice.

Lempert contends that practical hearing is at the level of an average 35 db. loss for 512, 1,024 and 2,048. Several years ago I made the observation that a child could have a hearing loss down to this level without the child, the parents or his teacher realizing that there was a hearing loss. Because of

these latter observations, I agree with Lempert that this can be considered a level of practical hearing. Lempert contends that no case shall be considered a successful one unless this level is attained. Shambaugh contends that an average 15 db. improvement at 512, 1,024 and 2,048 is considered a successful one. Campbell[14] agrees with Shambaugh's evaluation.

When one analyzes the American Medical Association method of determining percentage hearing, as shown in Fig. 2, one can see some of the reasons for this controversy.

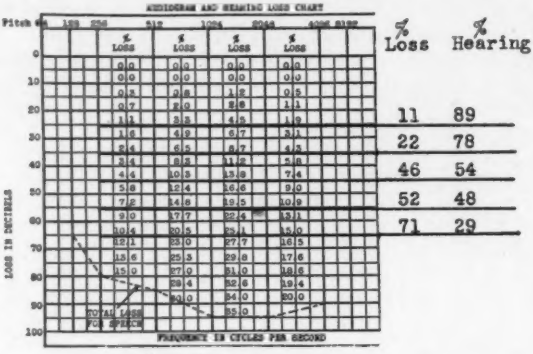

Fig. 2

You will see that an improvement from an average 65 db. loss to an average 55 db. loss is 19 per cent, while from an average 55 db. loss to an average 45 db. loss is only 6 per cent, and the greatest 10 db. step occurs from 45 db. loss to 35 db. loss where there is a 24 per cent improvement. It becomes obvious, therefore, that with our present knowledge of evaluating hearing to consider average decibel improvement without consideration as to where it falls on the audiometric chart, can result in nothing but erroneous conclusions.

Since the American Medical Association percentage determination was adopted after much careful work by eminent men in this field, and it seems to follow rather closely speech determination by other workers, this method of evaluating hearing should be used for reporting results from the fenestration operation; therefore, I offer the following classification:

1. Excellent: Eighty per cent hearing maintained for six months or longer.

2. Good: An increase of 20 per cent points in hearing maintained for six months or longer if an excellent result has not been obtained.

3. Poor: Any improvement less than excellent or good. Improvement not maintained. Stationary or further impaired hearing.

In the following table, I have listed my first eight cases done according to the Lempert nov-ovalis technique. The decibel loss columns are the average decibel loss for 512, 1,024 and 2,048. The per cent hearing columns represent those same audiograms transposed into per cent hearing (not per cent loss) by the American Medical Association method.

Case			Pre-Op. Hearing		Best Hearing			Present Hearing		
No.	Sex	Age	Db. Loss	%	Time	Db. Loss	%	Time	Db. Loss	%
1	F	37	57	38	6 wks.	45	62	10 mos.	63	31
2	F	58	58	50	9 wks.	25	81	9 mos.	22	83
3	M	29	45	73	6 wks.	27	85	9 mos.	43	67
4	F	31	45	65	4 wks.	23	89	8 mos.	23	88
5	F	26	52	51	7 wks.	43	68	8 mos.	51	50
6	F	25	45	73	4 wks.	28	87	7 mos.	32	82
7	F	53	72	17	4 wks.	43	65	6 mos.	62	39
8	F	22	47	60	4 wks.	33	80	6 mos.	32	82

Cases 1 and 5 are the two cases mentioned earlier that had decreasing bone conduction from 128 to 4,096 and in which I felt that there was no evidence of stapedial fixation at the time of the operation. Case 3 showed excellent, and Case 7 showed a good result; but at approximately the sixteenth week they began to show evidences of closure of the fistula and now must be classified as poor results. The other four cases may be classified as excellent results, making, for this series a total of 50 per cent excellent results. Case 7 had a facial paresis from the twelfth to the thirty-eighth postoperative day. There were no other complications.

SUMMARY.

1. The fenestration operation for stapedial impediment is a distinct advance in the therapy of this disease.

2. Improvement in our methods of hearing testing, particularly in bone conduction testing, will enable us more adequately to select the cases for this procedure.

3. The closure of the fenestra remains the main technical problem to be solved.

4. A more equitable method of evaluating results is offered.

5. The claiming of 85 to 90 per cent successful results is unwarranted at this time.

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A CASE OF ACUTE CAVERNOUS SINUS THROMBOPHLEBITIS WITH STAPHYLOCOCCUS SEPTICEMIA — TREATED WITH PENICILLIN RESULTING IN COMPLETE RECOVERY.*†

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Although a great deal has been written in medical literature in recent years concerning the diagnosis of cavernous sinus thrombophlebitis, the results were universally fatal until the discovery of the sulfonamides and penicillin.

In searching the literature, Nicholson and Anderson[1] report a recovery with unilateral ascending optic atrophy, treated with penicillin. Herein they cite several cases in which penicillin and the sulfonamides were used without success. The sulfonamides, especially sulfathiazole, have been used with success in a few isolated cases, as reported by Skemp, Rhoads, Afrenow, Barnshaw and Wolfe. "As late as 1937, MacNeal and Cavallo could find records of only seven reported recoveries from acute thrombosis of the cavernous sinus.

According to Lederer and Grove, the infection originates from four sources: First, from anterior foci, such as the lips, ala nasi, vestibule of the nose and the eyelids; spreading by way of the angular, supraorbital and supratrochlear veins to the ophthalmic veins and finally to the cavernous sinus. Such infections usually result from picking, scratching, squeezing or cutting a furuncle in these areas. Second, from internal foci such as the sinuses, turbinates and septum, occurring as the result of intranasal operations, carried through the ethmoidal veins or through the wall of the sphenoid sinus. Third, from inferior foci — that is, as the result of peritonsillar abscess, operations on the tonsil, operations on the superior maxilla and deep cervical abscess; spreading by way of the pterygoid plexus or by direct proximal extension of the internal jugular through the lateral sinus and petrosals.

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Finally, from the posterior foci, such as the middle ear and mastoid, by extension from the lateral sinus through the petrosals.

The symptoms represent a severe acute infection, characterized by local and systemic phenomena. The local signs depend mainly on which focus is involved; and the symptoms on whether or not the case has become septic in character.

The diagnosis cannot always be made with certainty, during the early course of the disease. To establish a diagnosis there must be the following:

1. A known source of infection.

2. Evidence of blood stream invasion.

3. Early signs of venous obstruction.

4. Involvement of nerves: IInd, IIIrd, IVth, Vth (ophthalmic division) and VIth, in the sinus.

5. Neighboring abscess of the soft parts.

6. Symptoms of a complicating disease.

The diagnosis is based upon the eye findings and the symptoms which are usually found with sepsis. Nausea, vomiting and general debility and high fever are characteristic.

The prognosis is decidedly grave despite the most radical intervention. Death ensues in from 48 hours to 10 days, especially in the septic form. Papilledema indicates increased intracranial pressure and is looked upon as a danger sign, as is extension from one eye to the other. As a rule, once a septic thrombosis has occurred, no form of treatment is effective in preventing a fatal outcome.

Prophylaxis depends on avoiding manipulation of a "pimple" about the nose, upper lip, or the pulling or cutting of vibrissae in the nasal vestibule, all of which are common practices.

The use of operative procedures in the presence of acute inflammation likewise should be avoided. Early care of orbital infections is an invaluable preventive measure.

The case to be presented is one of acute cavernous sinus thrombophlebitis with staphylococcus septicemia treated with penicillin resulting in complete recovery.

History: A white female, aged 29, admitted Aug. 23, 1944, complaining of fever, general aches and pains and swelling of the right side of the nose, right cheek and right eye. Three days prior to admission, the patient noticed a small tender swelling on the right internal naris. Hot fomentations were applied to the part externally by the patient and she avoided squeezing or scratching the area. One day prior to admission, she noticed severe swelling of the right nasal ala, right cheek, and was unable to open the right eye due to the severe perioorbital swelling. During the same day she experienced orbital pain with unilateral frontal headache. The evening prior to admission, she developed severe shaking chills followed by high fever, became extremely nauseous and experienced 11 attacks of vomiting. The symptoms progressed in intensity, and she was brought to the hospital in a semicomatose condition.

On admission the patient appeared well developed and well nourished, and presented the picture of an acutely ill person.

The positive findings consisted of an indurated furuncle, approximately 2 x 2 cm., on the internal surface of the right nasal ala, which extended toward the eye along the right nasal bone with abscess formation. There was bilateral exophthalmos and edema of both eyelids uniformly distributed between the internal and external canthi. The skin of the right cheek, nose and eyelids were red, hot and swollen, and a thick yellow discharge oozed from the inner angle of the palpebral fissure. The right eye was completely closed. The left eye, aside from proptosis and edema of the lids, was normal in all respects at this time.

The temperature on admission was 105.2°; pulse, 120; respiration, 28. Blood pressure, 120/80. The lungs were clear to percussion and auscultation and the heart was normal in all respects. The abdomen and extremities were proven negative.

Laboratory Data: Urine, negative; Kahn, negative; red blood cells, 4,150,000; 11.6 gm. of hemoglobin; white blood cells, 27,300; polymorphonuclear leucocytes, 91 per cent; eosinophiles, 2 per cent; lymphocytes, 7 per cent.

Blood culture taken on the second hospital day proved positive for hemolytic staphylococcus aureus. Five days later, blood culture again showed hemolytic staphylococcus aureus. Subsequent cultures of Sept. 4, 7 and 10 were negative.

On the second hospital day culture of pus from the nasal furuncle and from the eye discharge revealed staphylococcus aureus.

Sulfadiazine, gm. 5, then gm. 5 in eight hours was given for the first 24 hours, with sodium lactate, intravenously. The same dosage was repeated for the second 24 hours. Despite chemotherapy, the temperature fluctuated between 102°-105° F.; however, the blood culture became negative. At this point penicillin treatment was begun, the third hospital day, intramuscularly, at the rate of 20,000 units every four hours. Hot fomentations were applied locally to the right eye, and the abscess was incised on the internal surface of the right nasal ala, with drainage of 4 cc. of bright yellow pus. Due to the semicomatose state, infusions of 5 per cent glucose in saline were given intravenously each day and vitamins B and C administered intramuscularly as supportive nutrition.

Five days after admission, her condition was much improved, but she complained of severe occipital headache with stiffness of the neck. Neurological examination was negative, aside from a definite Kernig. Spinal tap showed pressure to be normal. Fluid was crystal clear. Chemistry, negative; culture, negative; cell count showed six lymphocytes per cc.

By the eighth hospital day the swelling about the nose, cheek and right eye had receded considerably. Examination revealed choked disc on the left with distension of the retinal veins. Vitreous haze prevented the identification of details in the right fundus.

On the tenth hospital day, the vitreous was much clearer in the right eye and marked engorgement of the retinal veins was noted. The arterial pattern appeared normal. The marked venous distension of the left eye was much less at this examination.

An examination the next day revealed paralysis of the superior rectus, inferior rectus, levator palpebrae and external rectus of the right eye, with paresis of the external rectus of the left eye. At this point, the patient began to complain of marked diplopia. Her course was one of general steady improvement, the temperature gradually falling to normal by lysis. The pulse, however, fluctuated between 110 and 140, out of proportion to the lowered temperature curve, but was regular. Penicillin was stopped on the twentieth hospital day for a period of 36 hours, and a drop in the pulse rate to 80 and 90 beats per minute was noted. Penicillin therapy was resumed and treatment ended on the thirty-first hospital day, with a total of 2,170,000 units being given by the intramuscular route. It is interesting to note that the pulse rate rose again with resumption of penicillin.

On the twenty-sixth hospital day funduscopic examination of the left eye revealed a normal pattern, and the paralysis of the external rectus revealed functional restoration. The right eye showed evidence of papilledema with paresis of the right external rectus. There was complete restoration of function of the superior oblique, inferior oblique and levator palpebrae muscles. The patient, however, still complained of diplopia.

On the fifty-fourth hospital day funduscopic examination of both eyes was completely negative. Complete restoration of extraocular muscle function was noted bilaterally. Visual field examination revealed 20/20 vision of both eyes, and the patient no longer complained of diplopia.

Before discharge, both the blood culture and urine were negative, white blood count, 6,000, with 72 per cent polymorphonuclear leucocytes and 28 per cent lymphocytes. Patient was discharged on the fifty-sixth hospital day as cured and in good general condition. Two months after discharge, physical examination was essentially negative and revealed no sequelae.

COMMENT.

The case presented herein was one of acute cavernous sinus thrombophlebitis with associated staphylococcus septicemia. The focus, as was stated, was a nasal furuncle. It is believed that the early diagnosis and the early treatment with penicillin were the contributory factors in complete recovery of this case. It was noted in therapy that the penicillin causes an associated rise in the pulse rate. This was proven by stopping of the penicillin treatment for 36 hours and a rapid decline in the pulse rate. On resuming penicillin therapy, the pulse rose to between 110 and 140 per mintue. The rapid decline of the temperature in the first 96 hours following the

initial dose of penicillin, accompanied by the four negative blood cultures and the subjective as well as the objective improvement of the patient, were directly attributed to the drug. The low grade temperature which persisted for four weeks has remained unexplained, since there were no embolic manifestations and no other complicating factors than the original pathology. The use of penicillin was prolonged because of the continued low grade temperature and not because of any complicating factors. It is, indeed, with gratification that a report of complete recovery is made, in view of the acute fulminating pathology and the extensive extra-ocular muscle pareses which existed and impressed us as being a grave prognostic sign.

I am grateful to Dr. John M. Loré and Dr. Acquin Kelly for their assistance and advice during the patient's stay in the hospital.

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TREATMENT OF LYE STRICTURE OF THE ESOPHAGUS.*

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The accidental swallowing of caustic alkali in the form of a solution of lye or proprietary washing or cleansing powders is the most frequent cause of cicatricial stenosis of the esophagus. Commercial lye preparations contain 95 per cent of sodium hydroxide, and cleansing and washing powders contain from 8 to 50 per cent of caustic alkali. The majority of these preparations bear no poison labels and claim that they will not injure hands or fabrics. Lye preparations go to the kitchen, as do also household ammonia, potassium carbonate (salts of tartar), sodium carbonate (washing soda, sal soda), bichloride of mercury, and sometimes strong acids. Carelessness is the main cause of these accidents, as from failure to wash utensils, etc.

Other causes of stricture are tuberculosis, syphilis, scarlet fever, diphtheria, enteric fever, pyogenic conditions, — in fact, anything causing ulceration may be followed by stricture; *viz.*, esophagitis, foreign body, peptic ulcer or herniation of the stomach.

Strictures may be multiple, central or concentric, and the sites may be at the cricopharyngeus, crossing of the left bronchus and hiatus. The symptoms are dysphagia, regurgitation, distress after eating and loss of weight. Large particles of food stop at the constriction, causing esophagitis.

In order to make a diagnosis, a complete history is necessary, and lavage must be employed to view the lesion. A *traumatic ulcer* will be thin and narrow; in *peptic ulcer* there will be a history of substernal pain. In *typhoid ulcer* there is usually a scar in the hypopharynx or cervical esophagus. A *syphilitic ulcer* is thick, dense and fibrous. Primary *tuberculous ulcer* is thin and superficial, while an old lesion is thick

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and wrinkled. *Perforation ulcer* is linear and vertical, and in the case of a *caustic ulcer* the scar is pale, white and elevated, or it may be annular or concentric.

Treatment: Blind bouginage is bad and usually results in death from perforation. The former treatment was to treat visible burns due to the lye and to neutralize the alkali with a weak acid. Strictures were treated only if and when they developed, and this is the method still used in many hospitals. Sulzer, in 1920, wrote a short paper on the early treatment in the hope of preventing a lye stricture. He reported excellent results where dilatation was begun on the second to sixth day after the caustic was swallowed. This was confirmed by Bokay, in 1924, when he reported excellent results in 127 out of 132 patients.

When a patient is seen early, an attempt should be made to neutralize the alkali with a weak acid, visible burns should have an emollient and the patient given a sedative. Dilatations should be started at once with soft rubber catheters closed at the lower end, filled with small shot and corked above. The catheters used are from size 14 to 34 French and are of sufficient weight and flexibility to pass with very little effort. The patient is in the sitting position. Length of treatment in each case depends upon the condition found on esophagoscopy. Starting with daily dilatation for two weeks, then three times a week for two weeks, the interval is gradually lengthened. Dilatation is always begun each time with a bougie two sizes smaller than the last one used, and the largest size is allowed to remain in place for 30 minutes. It is well to use fluoroscopy with barium to watch the progress of treatment. At the first sign of difficulty in passing a catheter, an esophagoscopy should be performed.

Burns of the mouth, pharynx and esophagus have decreased greatly during the past few years. This may be due to the campaign started by the Committee on Lye Legislation for the proper labeling of lye.

CASE REPORT.

On Oct. 7, 1938, L. B., a boy aged two, was admitted to the Lawrence Hospital in Bronxville, N. Y., two hours after swallowing an unknown quantity of Draino. Laryngoscopy and esophagoscopy were performed

and it was seen that the mouth, pharynx and esophagus were covered with a white membrane which bled very readily. A Levine feeding tube, No. 12, was then introduced through the nose.

For the next six months the child was examined once a month under general anesthesia and the esophagus was dilated with soft bougies.

On March 19, 1939, the child developed tracheobronchitis which necessitated a tracheotomy four days later. On April 4, 1939, the feeding tube was removed and the child took nourishment by mouth. On April 28, under general anesthesia with fluoroscopic guidance, attempts were made to pass soft bougies through the cardia, but these attempts failed. On May 1, a gastrostomy was performed by Dr. Wingebach, and one month later under general anesthesia, retrograde bouginage, using a No. 20 bougie, and core moulds were used to dilate the laryngeal stenosis. The core moulds remained in for three days. The larynx was dilated with metal dilators up to No. 30. A continuous thread was used through the gastrostomy wound to the nose from May 1, 1939, to July 12, 1944.

Monthly dilatations were performed through the years 1940 to 1941. On Feb. 13, 1942, the knot became untied and it was a problem to pass the soft bougie so that the thread could be used to pull up the retrograde bougie. This happened twice. During the balance of the year 1942, retrograde bouginage was done monthly. The soft rubber catheter method of Salzer was tried, but the child would not tolerate it.

On April 20, 1943, by direct esophagoscopy, the galvanic current was applied to the stricture for 10 minutes and this was repeated four times, with no benefit.

Retrograde bougies were used monthly when under fluoroscopic guidance, working with Dr. F. M. Law, a No. 12 two-winged retention catheter was introduced and left in situ. Larger sizes were introduced and finally a four-winged catheter, which was removed on July 12, 1944. Since then the child has been eating all of his meals, as well as peanuts, popcorn and corn on the cob.

Summary and Conclusions, after six and one-fourth years of treatment:

Anesthetics employed: Avertin, 73 times; ether, 28 times; ether and avertin, 18 times; no anesthetic, five times.

Child vomited up feeding tube three times.

Tracheotomy, March 24, 1939. Tracheotomy tube removed July 9, 1940. Tube in place one and one-fourth years.

Gastrostomy, May 1, 1939. Still wearing gastrostomy tube.

Core moulds in larynx three days.

Child in hospital 140 days.

Blood transfusions four times.

Galvanic current used five times.

Nasal feeding tube in place 87 days.

Tooth was missing once and found to be in esophagus at stricture.

I feel that with the present method of treatment, I will accomplish a cure of this case. The retention catheter was in place constantly from February until July.

The patient's present weight is 58 pounds, which is normal for his age.

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140 East 54th Street.

MANAGEMENT OF LYE BURN OF THE ESOPHAGUS IN AN ADULT WITH UNUSUAL COMPLICATIONS.*

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Of all the ills to which flesh has fallen heir, whether by accident or disease, nothing will tax the patience of either the victim or physician more than traumatic stricture of the esophagus. I have had the occasion to treat a case of lye ingestion by suicidal intent.

This patient, female, 26 years of age, with dementia praecox of paranoidal type, first seen Dec. 18, 1943, with a history of lye ingestion 15 days previously, following which she was able to swallow nothing but fluids. X-ray at this time, with contrast medium, showed a stenosis beginning at the fifth dorsal vertebra. Hospitalization was immediately advised, but due to the patient's mental status, it was deferred by her husband for four weeks, until Jan. 11, 1944. During this interval, the patient's weight dropped from 101 pounds to 96 pounds. Immediately following admission, an attempt was made to pass a Levine tube by indirect means; however, it could not be passed beyond the area of stricture. On the second day of admission, following venotherapy with glucose, saline and amino acids, the patient was taken to the operating room in the hope that a Levine tube might be passed directly. The upper stricture was found to be 25 cm. from the upper incisors. The Levine tube was threaded with wire, but even with this added support, the attempt was unsuccessful. A 6 mm. esophagoscope was then passed, and this constriction was dilated to the size of a 16 French, rubber-tipped dilator. The esophagoscope was then insinuated beyond this first constriction, and a second area of stricture was revealed 10 cm. below the first stricture. This second stricture would not admit anything larger than a 12 French, rubber-tipped dilator. The following morning the patient was able to swallow with much greater ease; and it was noted at this time that ice water when swallowed fell into the stomach in five seconds, by the patient's subjective sensation. Previous to this, the patient did not feel any cold sensation in her stomach when swallowing ice water, indicating that the ice water took so long to pass the area of obstruction that it became warm before entering the stomach. On this same day, her temperature rose to 102.6°. With this rise in temperature the patient complained of a severe boring pain in the region of the sternum, which radiated directly backwards to her left shoulder. This pain became more acute on swallowing.

Her chest showed diminished respiratory excursions on the left side, and the breath sounds and resonance were diminished on this side. There was splinting of the left diaphragm and spasm of the left rectus muscle. It was thought at the time, by the internist, that the patient was deveperò a left lower lobar pneumonia. The obvious possibility of perforation of the esophagus, secondary to dilatation, was considered, so that

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further study of the esophagus with a thin mixture of barium was made. There was no tear large enough to permit the passage of thin barium mixture. Following just one dilatation, the esophagus showed a considerably increased lumen. Two days later, when it was obvious by physical signs that there was fluid in the chest, a thoracentesis was performed. We were not satisfied that there was no opening in the esophageal wall communicating by way of the thin mediastinal pleura into the pleural sac, so we had the patient swallow a few mouthfuls of concentrated methylene blue solution before the chest was tapped. Ten cc. of clear, straw-colored fluid was removed from the left pleural sac with no element whatever of blueness. This fluid showed a pure culture of nonhemolytic streptococcus. Five days later, the thoracentesis was repeated by the closed method, after ingestion of methylene blue, and 500 cc. of cloudy, yellow fluid was removed with still no evidence of methylene blue. This fluid continued to reform and became more and more cloudy. Two weeks following the onset of her empyema, a closed thoracotomy was done and under-water drainage of the empyema was instituted. This complication, with its attendant effect upon the patient, prohibited any esophageal manipulation during this period. During this time she was supported by transfusion, amino acids and saline by vein, together with a reasonable amount of fluids and gelatin by mouth. She had her good and her poor days. On occasions she could swallow soft foods. At other times she could not even swallow fluids. Her poor days became more frequent and about four weeks following the first esophagoscopy, she was esophagoscoped once more. At this time the 7 mm. esophagoscope could be passed to an area 30 cm. from the upper incisors, and dilatation to 16 French was possible. The dilating tip could not be passed beyond an obstruction 5 cm. below the first obstruction. These dilatations were carried on at weekly intervals except for a period of 12 days during the latter part of the second month of admission, at which time rib resection with open drainage was instituted. It was believed at that time that the mediastinum was fixed. By the end of the second month of admission it was possible to dilate the upper stricture to a 20 French, and it was noted that epithelization was occurring in this area of dilatation. In the beginning of the third month of admission, due to her severe inanition and the necessity of instituting retrograde dilatation, a Janeway gastrostomy was deemed advisable as soon as possible.

During all this time the patient was never able to swallow and pass a black silk string. Apparently the lower stricture was much too tight to admit passage of a string. Toward the end of the second month of admission we were able to pass a 12 French to a greater depth than previously, so that on March 31 we made plans to pass a string through this lower stricture and recover it through the gastrostomy opening. We planned to push the string and recover it by way of a scope passed through the gastrostomy opening. The mechanics of pushing it through this lower stricture posed a problem, and as is so often the case, the simplest procedure proved the most efficacious. By simply tying a loop in the end of the silk, so that it would slip over the tip of the bougie, but not the base of the bougie, and with a 7 mm. scope insinuated beyond the first stricture, the dilator with its attached string was simply pushed into the stomach. Of course, where one job ended another began, and this was to locate the string through a 6 mm. scope in a nondistended stomach. Fortunately, Dr. Lore was present and he was ultimately able to identify the string, grasp it with the foreign body forceps and pull it out. From this time on, the mechanics of dilating the stricture became a simple problem. By the endless chain method, Tucker retrograde dilators were passed at regular weekly intervals up to size 24 French.

Due to better feeding, both by mouth and gastrostomy opening, her general state of health, of course, improved, so that on April 2, after three months of hospitalization, she was discharged. These dilatations were

continued until July, about the seventh month of her illness. A psychiatrist could probably give a more scientific explanation for this phenomenon, but suffice it to say that she was mentally cooperative and alert only when she was most desperately ill. In like manner, when her nutrition improved she became severely mentally ill and ultimately had to be confined to an institution. I understand retrograde dilatation continues to be carried out.

When the gastrostomy opening may be closed depends, of course, on how soon she maintains an adequate esophageal lumen.

A few facts of special importance bear repetition:

1. Pre- and postoperatively, although she had full intravenous dosage of sodium sulfadiazine, nevertheless, she developed a periesophagitis, which progressed to a pleurisy, at first of the serous type, finally becoming purulent. Penicillin at this time was not distributed for civilian use, and whether it might have prevented this complication I am not in a position to know.

2. It is possible without gross laceration of the esophagus for infection to travel from the esophagus through the thin mediastinal pleura to the pleural sac by continuity of tissue.

3. It is of prime importance in this type of lesion to pass a Levine tube as soon as possible. By this manner only may a lumen be maintained and nutrition continued during the early course of the disease.

4. We have demonstrated a comparatively simple manner in which a string may be passed through an otherwise impervious stricture.

25 Fifth Avenue.

HAMARTOMA OF TONGUE.

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Philadelphia, Pa.

Case: G. D., a baby girl, born Feb. 5, 1944, the third child of a syphilitic mother whose Wassermann test has remained positive despite repeated antiluetic treatments. Report of the family physician: All three children were delivered by forceps in occipitoposterior position. The third baby's Wassermann was negative.

Feb. 12, 1944: The nurse in charge reported that the baby's feeding had been difficult since birth. It was impossible to put her on a regular schedule. She refused to drink after a few attempts to suck from the bottle.

Physical examination revealed the baby in good physical condition. Upon investigation of its throat, a sessile tumor arising from the left side of the base of the tongue was found. The tumor had a smooth surface, the color of a normal mucosa, with a broad base of soft consistency resembling glandular tissue. The tip was very firm and movable, resembling a small pea in size and shape (see Fig. 1). The baby's feces were dark, an imminent sign of a hunger stool. It was obvious that the tumor was interfering with the child's ability to swallow properly. An emergency operation was indicated.

Operation (C. S.): Feb. 14, 1944. The baby was placed in the recumbent position, the tongue was pulled forward with a tenaculum, and the tumor grasped with a Kelly forceps and lifted upward. The base of the tumor was ligated with a plain catgut, and the tumor proper was removed with a Krause nasal snare. There was no hemorrhage. The postoperative course was excellent. The baby was put on a normal feeding schedule the same day. It was discharged with its mother, Feb. 16, 1944, two days after the operation. Two months later the mother reported that the baby was doing very nicely.

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Histology (Dr. William E. Ehrich): The material submitted revealed a tumor-like lesion, showing improper mixture of tissue elements usually found in this location. There were well differentiated mucous glands, streamers of smooth muscle fibres, some fat tissue, a good many blood vessels and

Fig. 1.

Fig. 2.

much collagenic connective tissue. The surface of the lesion was covered with well differentiated squamous epithelium. The high degree of differentiation of the various tissues contained in the lesion, and the absence of proliferative activity, were evidence that this was not a true tumor but a tissue malformation. After considering its composition, it was

best classified as a hamartoma. *Diagnosis:* Hamartoma (see Fig. 2).

This case is interesting from several points of view:

1. The Peculiar Property of the Lesion: The characteristic properties of a hamartoma were first described by Albrecht, who also coined the name Hamartio Defect). His first case was an angioma-like lesion of the liver, and he called it "Hamartoma Angiosum." Albrecht does not consider these as true neoplasms, but as tumor-like nodules resulting from superfluous tissue. Boyd gives a similar definition: *a developmental defect in tissue combination with a limited capacity for aberrant growth.* Genewein found similar fibroma-like nodules in the kidneys and called them "Hamartoma Angiofibrosum." He also found a disturbance of the development of the normal kidney structures. One of us (R. T.) observed a hamartoma angiofibrosum of the uterus. A similar case report was given by R. Mayer. Hamartoma-like nodules have been observed in the cortex and the medulla of the adrenal gland (R. A. Moore). Hickey and Simpson gave a description of a hamartoma of the pleura and the bronchus.

Thus far a hamartoma of the tongue has not been reported in any literature that was available to us. The aforementioned growth has an abundance of connective tissue and glands. The base has more of the latter, the top more of the former. The designation hamartoma adenofibrosum may thus be justified.

2. The Characteristic Location: The majority of lingual malformations are usually found in the area of the foramen caecum. It is the favorite site for structures of embryological disturbances because it is the juncture for portions originating as "anlage" from the various points of incidence (Virchow). The lesion in our case was similarly located. The anterior two-thirds of the tongue originates in the tuberculum impar, a small outgrowth of the ventral pharyngeal wall. The posterior third originates from portions of the second and third visceral arches. The former grows forward and eventually receives portions of the lateral tubercles of the two visceral arches. The latter, however, has a more complicated development. The portions forming the posterior third grow from either side and unite in the center. The

anterior portion of the sinus arcuatus, an open space which separates the two parts of the "tongue anlage," disappears at the end of the developmental stage. The foramen caecum is the vestige of this slit (see Fig. 3). Any irregular irritation or stimulation in this area may give rise to the various malformations. The hamartoma of our patient may have the same etiological base as the various congenital tumors, cysts, etc., discussed later under "Differential Diagnosis."

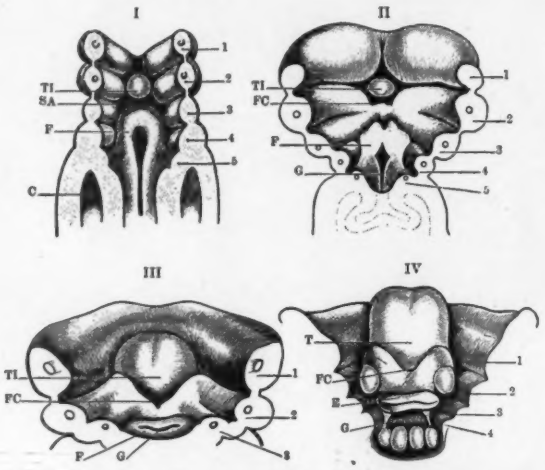

FIG. 30.—STAGES IN THE FORMATION OF THE TONGUE AND UPPER APERTURE OF THE LARYNX IN THE HUMAN EMBRYO (after His).

I. Embryo 14 days old. II. Embryo 23 days old. III. Embryo 28 to 30 days old. IV. Embryo 2 months old.

1, 2, 3, 4, 5 } Visceral arches.

C. Cœlom.
E. Epiglottis.
F. Furcula.
FC. Foramen cæcum.
G. Glottis.
SA. Sinus arcuatus.
T. Tongue.
TI. Tuberculum impar.

Fig. 3.

3. The Clinical Picture: It is striking that the small pea-sized lesion caused such a severe interference with the proper feeding of the baby. This fact is readily understood when we recall the peculiar anatomy of the baby's tongue in comparison to the adult's. The former consists of strong, thick musculature; its surface is smooth; the various papillae have not yet developed. The function of taste is relegated in favor of function, proper suction and deglutition. The size of the tongue in comparison to the neighboring structures is so

huge that during rest the fleshy lingual tip lies between the gums and lips outside the oral cavity proper. The corpus lingua lies like a pad in the mandible and rolls tube-like during deglutition. In the adult, however, the strong masseter, temporalis and buccinator are the chief muscles concerned with proper food intake. They are instrumental in chewing and, with the help of the pharyngeal constrictors and palatine muscles, squeeze down the bolus. The tongue loses its previous importance and, having become smaller and thinner, falls back into the oral cavity. Small tumors of the tongue, therefore, do not bother the majority of adult patients, and very often are found accidentally during an occasional check-up.

Small lesions in a baby's oral cavity, however, may have serious consequences. In our case the small pea-sized tumor interfered with the proper food intake to such extent that the appearance of the hunger stool indicated emergency surgery. Seiffert reported dyspnea caused by a papilloma of the lingual base. Marx and Blau saw two fatal accidents to babies, due to suffocation precipitated by a lingual cyst.

4. Differential Diagnosis: a. Bearing in mind the mother's history, we had to consider a syphilitic gumma. O. Kren reported cases in this category.

b. The firm, hard consistency of the lesion suggested a fibroma. Fibromas appear at the lingual base as sessile and pedunculated tumors. They are either simple fibroma or of a mixed type, like a neurofibroma (Recklinghausen); a fibroma interwoven with cartilage (Barry); a fibromyxoma; a fibromyoma (Blau); or a rhabdomyoma (Pendl).

c. Papilloma of the lingual base has been described by Seiffert and O. Kren.

d. Another possibility was the existence of an angioma. It settles predominantly in the areas of the congenital slits, thus also at the base of the tongue. It was, therefore, called "fissurale angioma" by Virchow. It may appear as hemangioma or lymphangioma. Either type may grow into a cystic or a cavernous tumor. In our patient we had to consider the probability of a lymphangioma.

e. The most frequent lesions of the lingual base are cysts. They originate from the ciliated epithelium covering the

side buds of the thyroglottic duct (M. B. Schmidt) or from the stratified epithelium of the ductal outlet itself (Bochdalek's tubes). True cysts may also form as evagination of other glands of the lingual base or as a degenerative stage of the lymphangiomas.

f. The last and perhaps the most important lesion for our differential diagnostic studies is that of the lingual thyroid. Its appearance is due to a disturbance during the embryological stages which has prohibited a partial or total descent of the thyroid gland through the thyroglottic duct. Until 1925 about 100 cases had been reported in the literature (Ash). Rubelli and Ash reported that thyroid tissue together with the parathyroid bodies was removed from the lingual base. A deficiency disease like myxedema or tetany may follow such surgical interventions.

SUMMARY.

1. The characteristic features of a hamartoma (Albrecht) as a bridging link between normal tissue and true tumors was discussed. Our case is the first known hamartoma of the tongue.

2. The characteristic location of congenital tongue lesions was stressed. The base of the tongue being the favorite site since various embryological portions converge at that point.

3. The clinical picture was described with special reference to the anatomical and physiological properties of the baby's tongue in comparison to that of the adult.

4. A short discussion of the differential diagnoses concerning this case was given.

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Central Medical Building.

Medical Arts Building.

THE AMERICAL LARYNGOLOGICAL, RHINOLOGICAL AND OTOLOGICAL SOCIETY, INC.

The Annual Meeting of the Triological Society will be held at The Drake in Chicago on Monday and Tuesday, May 28 and 29, 1945. Annual meetings of the American Laryngological Association, the American Broncho-Esophagological Association and the American Otological Society, Inc., will continue for the remainder of the week.

Due to the exceptionally heavy demand for guest rooms, it is necessary to make reservations as far in advance as possible. Please advise the hotel the time and date of departure.

TREATMENT OF VINCENT'S ANGINA.*

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The treatment of Vincent's angina has been a puzzle ever since its specific recognition by physicians. One of the first to describe it clinically was the French physician, Vincent, from whom it derived its name. In the last war, public attention was called by the high incidence of its occurrence in soldiers in the trenches, and it is known to the lay public as "trench mouth." Trench mouth, or Vincent's, has had multiple types of treatments by various physicians. The very indication of the number of treatments offered is indicative of the various angles of approach to treatment that has been instituted in the past. In my discussion of the treatment of Vincent's angina I wish to review the types of treatment advocated and what has been, in my experience, the combinations that have given me the best results. First of all, Vincent's occurs in all classes of people, from the lowest social stratum to the highest. The onset is usually heralded by an acute sore throat which sends the patient to his physician. The previous history is not indicative of any specific prodrominal symptoms; however, the most predominant feature is one of fatigue, loss of rest and a general run-down condition.

Upon examination, in the early cases, the lesions usually appear as small red areas over the posterior pharynx and tonsillar pillar area. These red areas become gray and patchy, the gray area sloughing in patches and ulcerating. Upon removal of these patches there is an ulcerating, bleeding crater area. The pain is far out of proportion to the lesion.

The cause of such acute rapid ulcer-producing lesions has been the bone of contention for bacteriologists, and the inability to specifically nail it down to one single type of organism

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has bred the greatest difference of opinion and, henceforth, the multiple number of treatments advocated.

Vincent's angina, bacteriologically, has been considered as a spirillum, also a fusospirillosis. I believe that the picture is somewhat more complicated than that, and the least one can say is that it is a multiple infection, including the various streptococcus and cocci infections. It stands to reason that a rapidly advancing lesion upon a raw, bleeding and ulcerated surface would also be a hotbed for the normal existing oral infections of the mouth that would be thoroughly incubated. I am convinced that Vincent's is a mixed infection. The multiple number of approaches to the treatment and the failure of any one specific remedy to hold, I believe, will bear me out. My approach to the treatment has been one that might be criticized as a shotgun affair, but one that has given me results, and I see no reason to change.

At this time it is well to review briefly some of the approaches to this treatment. Arsphenamine, and neoarsphenamine, mepharsen and various sulfa groups have been used, all with various clinical improvement. Even vitamins have been of specific help in numerous series of cases. Bismuth and bismuth salicylate and the heavy metals have been used and still we have various unsatisfactory results on just treating them with one type of medication. The dentists have treated it for years by local application. In their series of results, they have proceeded to treat it, especially on the gingival surfaces, by various tinctures of iodine in combination with acconite and sodium perborate. One can easily see, in this brief outline, that any approach must be made with an open mind. In the beginning of the treatment of Vincent's there are several pitfalls which must be carefully avoided. First, it is wise, in a case that has a suspicious history, or for any reason which the physician might deem necessary, to rule out what Osler designated "The Great Deceiver," syphilis. Second, we occasionally encounter granulocytropenia. In any case with ulcerated lesions of the mouth, with fatigue, weakness and malaise out of proportion to the clinical findings, an immediate blood picture should be obtained. Granulocytropenia is so rare that I do not recommend a blood picture as a routine, especially in hurried wartime conditions; but any case that does not show a reasonably immediate

improvement must have a blood picture smear and blood test. It is wise to try to obtain a culture smear for future reference and to establish the specific organism found. The unsatisfactory results from single smears and delays in finding any one specific organism is one of the reasons, bacteriologically, we believe that Vincent's must be considered a mixed infection. The very absence of spirillum or the fusospirillosis in a single smear or even two or three smears does not preclude their absence.

A typical case complains of acute sore throat. Examination reveals difficulty in opening the mouth, pain upon swallowing and even discomfort in talking. The temperature ranges between 99.6° to 100°. The breath is usually fetid. Examination of the throat will show usually the typical ulcerated lesion or lesions which have been described above. A smear is taken directly and examined. The careful history as to the onset, time and duration of the illness is obtained. The lesion is then cleansed out down to the bleeding surface where a careful inspection of the extent and degree and destruction of tissue is seen. Two per cent cocaine is painted in and around the area. The patient then is given a blood test and 0.45 gm. of neoarsphenamine is injected intravenously; either sulfathiazole gum or lozenges is given to the patient with instructions to dissolve one tablet on the tongue every two hours, or to chew one piece of gum for 20 minutes every two hours. For the general malaise and aching, the patient is given a combination of codeine and aspirin, varying anywhere from $\frac{1}{8}$ to $\frac{1}{2}$ gr. of codeine and 5 to 10 gr. of aspirin every four hours, according to the size and age of the individual. Oral hygiene is advocated only as a cleansing method and this only three to four times a day, as we prefer a high concentration of the sulfa drugs in the saliva and on the mucous membrane. Vitamin C tablets are given in 100 mg. doses, administered orally. In all cases showing no improvement within 72 hours, we not only repeat the intravenous neoarsphenamine but also touch up the lesions directly with neoarsphenamine. The use of arsphenamine, vitamins and the sulfa group may seem a more or less blanket measure. In the past, failures of adequate and quick recovery from Vincent's we believe, on this basis, were due to failure to recognize its mixed nature. It is still a moot question whether this

mixed infection is the result of secondary invaders or a primary combination of factors. Regardless of the fact that, whether they are primary or secondary invaders, the secondary invaders, if considered as such, may soon and quickly become a primary issue. Approaching the matter from a combined angle of actuality and that which may develop, we believe that we have shortened the acute period and hastened the recovery. It is a well known fact that many persons under active treatment for syphilis, with an adequate arsenical level in the body, have developed Vincent's and this is ample proof that neoarsphenamine is not always the one specific. At the same time, it may be said that Vincent's has developed in individuals while under treatment with the sulfa group. Again, in avitaminosis in the malnourished individual, with neither syphilis nor debilitating diseases, Vincent's has been prone to develop. In considering all these angles, it seemed worthwhile to consider Vincent's as a clinical entity which attacks individuals who, either through a change in the oral flora or a change of pH in the body, render themselves susceptible to normally present oral infections or one which has been recently introduced, the virulence of which the individual has failed to combat immediately and completely.

CONCLUSIONS.

1. Vincent's, I believe, should be considered as a multiple infection producing ulcerated lesions in the mouth. *2.* The failure of any one specific medication supports this opinion. *3.* A combination of the arsphenamine group intravenously and by direct application and a high oral concentration of the sulfonamides plus adequate vitamin C has produced better and quicker results in my case of Vincent's angina than any other single drug or combination of drugs in 40 years' practice.

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3117 West Avenue.

PERIESOPHAGEAL ABSCESS. CASE REPORT.*

RAYMOND J. GAFFNEY, M.D.,
New York, N. Y.

Periesophageal abscess is rare, and in this case the exciting cause seems unusual. Mortality resulting from the presence of foreign bodies in the esophagus has dropped sharply since Mikulicz gave us the esophagoscope in the latter part of the nineteenth century; but we still encounter tears, both by the foreign body and by the endoscopist himself. Mediastinitis in its various aspects is still a dangerous complication, spreading from above the clavicle even to the diaphragm and involving several vital organs in its course. We read of rupture of the carotid artery or fatal disease of the spinal cord from slow erosion caused by an impacted coin. Killian alone reported 40 cases of erosion of the carotid artery. These cases were mostly a complication of an esophagotomy. In considering rupture — and the case about to be reported must be classed as a rupture — let us be conscious of the fact that the esophagus has a thickness of 2 mm. distensible if you will, but ever so vulnerable. The esophagoscope can tear, and the operator be conscious of it only after the patient goes into rapid shock or develops a spreading emphysema of the chest and neck, or less severely, an evident swelling of the neck, with dysphagia. Or again, a swallowed object, as in this case, can tear the mucous membrane and pass into the stomach. A perforated esophagus usually causes death, but a tear in the mucous membrane can be readily healed by nature. Perhaps we can class the grades of pathology as: *1.* Mild local reaction with quick resolution. *2.* Localized abscess in the periesophageal tissues. *3.* Spreading cellulitis involving the posterior mediastinum.

It can be stated, I believe, that a perforation can take place and not cause death; every injury to the esophagus has not been reported. The introitus is found at the level of the sixth cervical vertebra. Any pathology in the tissues from that level down can be classed as a mediastinitis. This case report is, then, one of upper mediastinal involvement, or periesopha-

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geal abscess in the cervical region, which has its lower limit at the fourth dorsal vertebra.

B. J., a building superintendent, while chewing a hard crust of rye bread, shouted at a workman. The crust slipped down beyond his control and he at once experienced a severe pain deep in his throat. The pain continued spreading to his right arm, sternum and back. Within an hour he had a fever and went to bed. The family physician treated him for four days, and I first saw him on the fifth. At that time he was lying in bed with his head fixed and continually clearing away saliva — a good example of the Jackson sign indicating faulty action or blocking of the esophagus. Mirror examination of the airway was negative. The posterior pharyngeal walls were normal; both pryriform fossae were filled with saliva. Externally, a fairly large swelling was evident on the right side of the neck at about the level of the cricoid, and this was very painful to touch. The patient's temperature was 104.5° F., and his pulse 124. I sent him to St. Vincent's Hospital with a diagnosis of periesophageal abscess.

X-ray films showed extreme widening of the prevertebral space and a fluid level at the bottom of the seventh cervical vertebra, with air bubbles. Surgery, which we considered urgent, was performed under local anesthesia, choosing the anterior approach; that is, along the anterior border of the sternocleidomastoid muscle. This case well confirmed the observation that landmarks cannot be depended upon with the extreme distortion and displacement of organs present. In our search for pus we found ourselves external to the carotid sheath. The pathology must of necessity be located somewhere between the carotid sheath externally and the area of the esophagus and the trachea internally. This is the region which determines the surgical approach. If the esophagus is damaged anteriorly, then the pointing and tenderness are anterior to the sternomastoid muscle; if posteriorly, then posterior to the muscle. As well as we could determine from the extreme swelling, the pathology seemed anterior and our approach was, therefore, the anterior one. After having gone astray at first, we located the pulsating carotid, and by careful dissection internal to that vessel, finally came upon a glistening bulge, externally, just below the level of the cricoid cartilage. This was no doubt the pretracheal fascia. Incision caused a welling up of flocculent pus.

The wound drained freely for several days. On the sixth day postoperatively, the patient asked for solid food. His total stay in the hospital was 18 days, with complete healing of the wound. Neoprontosil was administered, with an average of 80 gr. a day. The white blood count was 18,000 on admission. The temperature ranged from 104.5° F. to normal in one week. Culture from the pus revealed staphylococcus hemolyticus. Blood culture was negative.

This pathology seems to be rare; Hunt reports 20 cases in three of New York's largest hospitals over a period of 10 years. The surgical approach is not without danger, due to the marked distortion of the anatomy, and no surgeon can draw heavily on past experience.

To sum up, the signs and symptoms in this case all fit in with the diagnoses of periesophageal abscess: *1.* Assumed perforation by a crust of bread. *2.* Severe dysphagia. *3.* Pain and tenderness externally. *4.* Widening of the prevertebral space. *5.* Fluid level with air bubbles. *6.* Leucocytosis. *7.* High fever.

20 Fifth Avenue.

CARCINOMA OF THE ESOPHAGUS—APPARENT CURE. CASE REPORT.*

RAYMOND J. GAFFNEY, M.D.,
New York, N. Y.

It is hoped that the words "apparent cure" are properly interpreted in this report, for to date it is far from the accepted "five-year cure."

K. C., a single woman, has been known to the presenter for many years, and has never been free from some ailment, real or imagined. She is now 59 years of age. Two years ago she complained that the swallowing of solid food was becoming more difficult. I say more difficult, for she claims dysphagia for the last six years. The patient consulted a physician in her town, and he suggested that she undergo further study. The Wassermann reaction of the blood at this time was negative.

On Nov. 9, 1942, she was admitted to St. Vincent's Hospital for Roentgen study of the esophagus. The bismuth meal passed readily into the stomach. We did not deem it necessary to perform an esophagoscopic examination and we allowed her to return home. In retrospect, it seems that we were possibly dealing with an undiagnosed case of Vinson-Plummer syndrome. By May, 1943, her condition was becoming poor, with a drop in weight from 120 to 95 pounds, and at this time fluids were not passing down well. The patient was readmitted and under general anesthesia the esophageal speculum was passed. At the cricopharyngeus a large, fungating growth was found which bled easily on touch. The lumen of the esophagus was not visible, and any attempt to probe for it caused bleeding. A biopsy specimen was obtained. Macroscopically the lesion appeared to be malignant, and this was confirmed microscopically. A Janeway gastrostomy was promptly performed, and after a brief stay in the hospital she was sent home. Her relatives were acquainted with the seriousness of her condition, being told that surgery was not considered in that location and that X-ray therapy would be the only forlorn hope. As the patient lived a long distance from New York, I saw her no more for some time. Later, I was informed that for several weeks she had been undergoing the X-ray treatments suggested. In April, 1944, 11 months after discharge, she was readmitted to the hospital for another esophagoscopy. While she had gained 10 pounds in weight and looked much improved, she keenly missed solid food.

On exposing the region of her pathology, we were astonished to find nothing but perfectly smooth tissue, much hypertrophied, with a small lumen in the center which admitted a No. 14 metal laryngeal dilator with gentle pressure. The former cauliflower growth had completely disappeared. On several occasions since, I have dilated the stricture, progressing up to a No. 28 dilator. For a short time semisolid food passed down, and even well-chewed solid material. I performed an esophagoscopic examination on Nov. 24, 1944, and found the picture to be the same except that the lumen was somewhat smaller than in early July. Another esophagoscopic examination on Dec. 8 found the lumen quite patent. At present the patient keeps fairly well and does light housework.

Pathologic Report: The specimen consists of esophageal mucosa with several nests of epidermoid carcinoma. The tumor is in the form of broad columns of hyperchromatic cells resembling the basal cells of the epithelium. They penetrate the underlying subepithelial tissue for a short distance. Diagnosis: Epidermoid carcinoma.

Hopeful results are being reported in X-ray therapy of carcinoma of the larynx. Why should we not look for some encouragement in the treatment of carcinoma of the esophagus in this accessible location?

20 Fifth Avenue.

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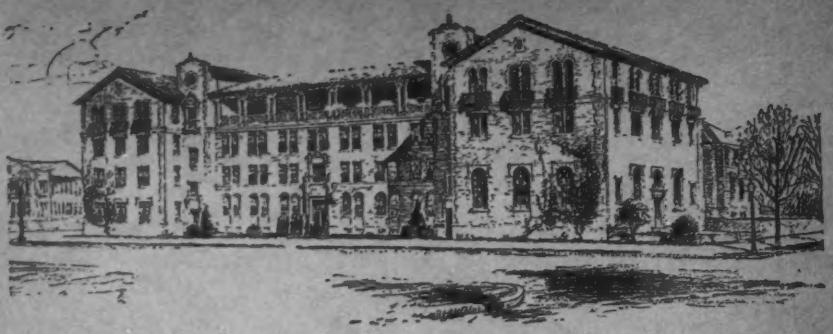

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